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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/511,569 | 03/28/2005 | Xinxi Diao | UNT-0001 | 4495 |
| 23413 | 7590 | 09/15/2006 | EXAMINER | |
| CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 | | | SAFAIPOUR, BOBBAK | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2631 | |

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------|--------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/511,569 | DIAO ET AL. | |
| | Examiner | Art Unit | |
| | Bobbak Safaipoor | 2631 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>10/12/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement submitted on 10/12/2004 has been considered by the Examiner and made of record in the application file.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Consider **claim 4**, it claims the system and the method of steps of using a repeater. This makes claim 4 become indefinite under 35 U.S.C. 112, second paragraph because claiming a system and the method of steps of using the system in one single claim would be held to be ambiguous. Please refer to Ex parte Lyell, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990).

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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Claims 4-7 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. **Claim 4** claims a system and the method of steps of using the repeater. Based on the theory that the claim is directed to neither the “process” nor a “machine”, but rather embraces or overlaps two different statutory classes of the invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. *Id.* at 1551.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by **Riley et al (United States Patent Publication #2003/0054813 A1)**.

Consider **claim 1**, Riley et al disclose a repeater, comprising: a cell identifier generator module in a downlink circuit structure of said repeater, wherein said cell identifier generator module comprises:

a synchronization searching unit for searching for a base station pilot signal (page 3, first column, lines 39-40 and 45-48; The system includes a searcher 116 to detect and quantify the level of signals received by the receiver 110. The searcher performs a

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correlation analysis between a reference signal and a received signal and generates a correlation output signal);

a time delay unit for generating a fixed delay according to the searching result from the synchronization searching unit (page 3, second column, lines 4-7 and 55-61; The system 100 includes a timer 124 to provide system timing that is used to measure delay times in the arrival of signals from base stations or GPS satellites. When the PN code is transmitted from a base station there may be a delay due to the PN offset assigned to each transmitter. In addition, there is propagation delay that is indicative of the distance between the transmitter and the mobile unit 10. It is this propagation delay that can be measured by the system 100 to determine the location of the mobile unit);

a cell identifier signal generating unit for generating a cell identifier signal (page 3, first column, lines 53-56; A signal analyzer or modeling processor 120 analyzes the correlation signals and uses a statistical model 122 to uniquely identify the base stations whose signals are received by the mobile unit)

wherein a delay between a frame start time of the base station pilot signal and a frame start time of the cell identifier signal is the fixed delay (page 3, second column, lines 4-7; The system 100 includes a timer 124 to provide system timing that is used to measure delay times in the arrival of signals from base stations).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 2-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Riley et al (United States Patent Publication #2003/0054813 A1)** in view of **Cook et al (United States Patent #6,005,884)**.

Consider **claim 2**, and as applied to **claim 1** above, Riley et al disclose the claimed invention except for the repeater comprises and input end of said cell identifier generator module is connected to a low-noise amplifier module of the repeater, and an

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output end of said cell identifier generator module is connected to a power amplifier module of the repeater via a coupler.

However, in the same field of endeavor, Cook et al clearly disclose as known in the art a receive path 56 that includes a band pass filter 114 connected to a low noise amplifier 112. The input of the low noise amplifier 112 is connected to the circulator 106. The power amplifier 104 and the low noise amplifier 112 are connected to the output of the voltage regulator 92 via the bias switch 100 (figure 5; col. 21, 30-43).

Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Cook et al into the system Riley et al to comprise the principal components of the repeater.

Consider **claim 3**, and **as applied to claim 2 above**, Riley et al disclose the claimed invention except for wherein said cell identifier generator module also comprises: a down-conversion unit, an A/D (Analog to Digital) conversion unit, a D/A (Digital to Analog) conversion unit, an up-conversion unit, and a filtering unit; wherein said down-conversion unit is designed to carry out frequency conversion from RF to intermediate frequency for received signals; said A/D conversion unit is designed to carry out sampling and quantification for the intermediate frequency signals; said D/A conversion unit is designed to carry out D/A conversion to obtain a base-band form of the cell identifier signal; said up-conversion unit is designed to carry out conversion from base-band to RF for the cell identifier signal; said filtering unit is designed to carry out band restriction for the cell identifier signal to control frequency leakage to adjacent frequency; said cell identifier signal is coupled to an input end of the power amplifier in

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the downlink circuit structure of the repeater via said D/A unit, up-conversion unit, and filtering unit.

In the same field of endeavor, Cook et al show and disclose as known in the art a DAC 84 that receives the digital outgoing data from the first communications link 26. In response, the DAC 84 conducts a digital-to-analog conversion operation, thereby generating an analog version of the digital outgoing data. Consequently, the DAC 84 outputs an IF signal of the outgoing data to the up-converter 54. The up-converter 54 shifts the frequency range of the IF signal to the RF range, thereby generating an RF signal of outgoing data. The transmit amplified 62 accepts the RF signal of outgoing data and, in response, generates amplified outgoing data. The transmitted outgoing data is forwarded to the remote terminals 16 within the coverage area 20 of the repeater 18b via the antenna 24 (col. 19, lines 15-28).

Furthermore, Cook et al disclose that the distribution of digital versions of incoming and outgoing data packets on the communications link 26 requires the inclusion within each repeater 18b of an analog-to-digital converter (col. 17, lines 32-27). The frequency converter module 50 can supply an RF signal to the transmit amplifier 62 in response to an IF signal from the signal converter module 80 and an IF signal to the signal converter 80 in response to an RF signal from the receive amplifier 60. The signal converter 80 includes an ADC 82 and a DAC 84, each connected to the first communications link 26, for conducting signal conversion operations (col. 17, lines 45-52).

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Cook et al also disclose that the down-converter, which is connected between the first communications link and the receive amplifier, converts the amplified incoming data to an IF signal of the incoming data (col. 5, lines 54-57).

Additionally, Cook et al disclose a low pass filter 108 is connected between the antenna 24 and the circulator 106 where both amplified outgoing data and incoming data are passed via the low pass filter 108 to filter undesired out-of-band frequency components (col. 21, lines 58-65).

Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Cook et al into the system Riley et al to comprise the principal components of the repeater.

8. Claims 4, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Riley et al (United States Patent Publication #2003/0054813 A1) in view of Hua Chen (European Patent Application #1 030 531 A1).

Consider **claim 4**, and **as applied to claim 1 above**, Riley et al show and disclose the claimed invention except for a method for positioning a mobile station comprising:

(1) issuing a cell identifier signal, a fixed delay, and a search window width from the repeater in response to a positioning request from the mobile station, wherein the cell identifier signal is searched in a time range defined by the search window width and the fixed delay;

(2) the mobile station measuring a Time Difference of Arrival (TDOA) between the cell identifier signal and a base station pilot signal and reporting the measured TDOA;

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(3) determining whether the value of TDOA equals to the fixed delay; if so, going to step (4); otherwise going to step (7);

(4) measuring a Time of Arrival (TOA), TOA_m , from the mobile station to the base station through the repeater;

(5) determining a value of TOA_{trans} with the formula: $TOA_{trans} = TOA_m - TOA_c$, wherein the TOA_{trans} means TOA from the mobile station to the repeater, and the TOA_c means a calibrated TOA from the repeater to the base station;

(6) calculating the distance between the mobile station and the repeater through multiplying TOA_{trans} with light velocity; and

(7) determining the position of the mobile station.

However, in the same field of endeavor, Hua Chen shows and discloses as known in the art a method for measuring the distance between the mobile station and each of the base stations. Assume the coordinates of the three base station are (x_1, y_1) , (x_2, y_2) , and (x_3, y_3) , and the mobile coordinate is (x, y) . The distance between the mobile station and each of the base stations is calculated using $d_1 = c * t_1$, $d_2 = c * t_2$, and $d_3 = c * t_3$, where t_1 , t_2 , and t_3 are the time it takes for the signals from BS1, BS2 and BS3 to reach the mobile, respectively, and c is the speed of light. Hua Chen discloses the TDOA hyperbola formulas $d_2 - d_1 = c * (t_2 - t_1) = \sqrt{(x-x_2)^2 + (y-y_2)^2} - \sqrt{(x-x_1)^2 + (y-y_1)^2}$, $d_3 - d_1 = c * (t_3 - t_1) = \sqrt{(x-x_3)^2 + (y-y_3)^2} - \sqrt{(x-x_1)^2 + (y-y_1)^2}$. In a CDMA system, $d_2 - d_1 = c * (t_2 - t_1) = c * (\text{Phase 2})$ and $d_3 - d_1 = c * (t_3 - t_1) = c * (\text{Phase 3})$, where Phase 2 and Phase 3 are the chip off-set of the second and third pilot that comes from BS2 and BS3, respectively. The resolution of a pilot phase is in a chip (1 chip = 0.8138 us) with

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CDMA standard IS-95. Therefore, $d_1 = C * (t_{\text{receive}} - t_{\text{send}})/2 = \text{sqrt}((x-x_1)^2 + (y-y_1)^2)$.

Furthermore, Hua Chen discloses the TOA Circle formula in a CDMA system where

$$d_1 = c * (t_{\text{receive}} - t_{\text{send}})/2 = c * \text{RTD}/2.$$

Therefore, it would have been obvious of one of ordinary skill in the art to incorporate the teachings of Hua Chen into the system of Riley et al to calculate the distance between the mobile station and base station.

Consider **claims 6 and 7**, and **as applied to claim 4 above**, Hua Chen further discloses the method for positioning a mobile station via a TDOA and TOA positioning methods to calculate the distance between the mobile station and base station.

9. **Claims 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Riley et al (United States Patent Publication #2003/0054813 A1)** in view of **Lobinger et al (United States Patent Application Publication #2003/0181208)**.

Consider **claim 5**, and **as applied to claim 4 above**, Riley et al show and disclose the claimed invention except for the cell identifier signal is a scrambling code of the base station, which is different from that of adjacent base stations.

In the same field of endeavor, Lobinger et al show and disclose as known in the art signals being transmitted from base stations in accordance with the different scrambling codes (paragraph 4).

Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Lobinger et al into the system of Riley et al to have the mobile station be continuously adjusted for decoding and evaluating the transmit signals from base station of adjacent cells in accordance with the different scrambling codes.

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Conclusion

10. a) (U.S. Patent # 6,185,428 B1) disclose a **System and method for adaptively modifying base station transceiver resources for time of arrival measurements.**

b) (U.S. Patent Application Publication #2003/0009652 A1) disclose a **Signal translating repeater for enabling a terrestrial mobile subscriber station to be operable in a non-terrestrial environment.**

c) (U.S. Patent Application Publication #2003/0133424 A1) disclose a **Path diversity equalization CDMA downlink receiver.**

11. Any response to this Office Action should be **faxed to (571) 273-8300 or mailed to:**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Bobbak Safaipoor whose telephone number is (571) 270-1092. The Examiner can normally be reached on Monday-Friday from 9:00am to 5:00pm.

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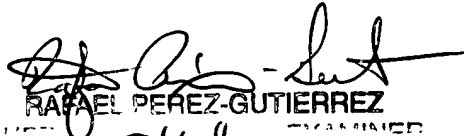
If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Perez-Gutierrez can be reached on (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Bobbak Safaipoor
B.S./bs

September 11, 2006


RAFAEL PEREZ-GUTIERREZ
9/13/06